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L1: Entry 1 of 2

File: JPAB

Feb 26, 2002

PUB-NO: JP02002059711A

DOCUMENT-IDENTIFIER: JP 2002059711 A

TITLE: PNEUMATIC TIRE

PUBN-DATE: February 26, 2002

## INVENTOR-INFORMATION:

NAME

COUNTRY

IWAMURA, KAZUMITSU

## ASSIGNEE-INFORMATION:

NAME

COUNTRY

SUMITOMO RUBBER IND LTD

APPL-NO: JP2000251251

APPL-DATE: August 22, 2000

INT-CL (IPC): B60C 11/11; B60C 5/00; B60C 11/00; B60C 11/04; B60C 11/12

## ABSTRACT:

PROBLEM TO BE SOLVED: To restrain uneven wear on a shoulder block due to turning driving.

SOLUTION: A chamfer 17 chamfering width W between a lower ridge edge KL crossing a groove wall 16 and an upper ridge edge KU crossing a tread surface 2S of which increases toward the later grounding side from the tire first grounding side is formed on the groove wall 16 of the tire equatorial side of the shoulder block 12. Chamfering width Wo on a block end on the later grounding side is more than two times of chamfering width Wi on a block end on the first grounding side and less than 8.0 mm.

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L1: Entry 2 of 2

File: DWPI

Sep 2, 2003

DERWENT-ACC-NO: 2002-356816

DERWENT-WEEK: 200358

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**TITLE:** Pneumatic tire for vehicle, has chamfer of preset width cut between bottom and top edges of groove wall in shoulder block, so that chamfer width is wider at back than at front

**PATENT-ASSIGNEE:**

ASSIGNEE	CODE
SUMITOMO RUBBER IND LTD	SUMR

**PRIORITY-DATA:** 2000JP-0251251 (August 22, 2000)

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**PATENT-FAMILY:**

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
<input type="checkbox"/> <a href="#">JP 3441705 B2</a>	September 2, 2003		007	B60C011/11
<input type="checkbox"/> <a href="#">JP 2002059711 A</a>	February 26, 2002		007	B60C011/11

**APPLICATION-DATA:**

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**ABSTRACTED-PUB-NO:** JP2002059711A

**BASIC-ABSTRACT:**

**NOVELTY** - The tire has a shoulder block (12) whose equator side groove wall (16) facing a vertical main groove (10B), is cut to a chamfer (17) between bottom and top edges (KL,KU) crossing the groove wall and the tread surface (2S). The chamfer width (W) is set below 8 mm with larger width (Wo) at block end at the back than the width (Wi) at the block end beside the front side.

**DETAILED DESCRIPTION** - The shoulder block is surrounded by several vertical and horizontal main grooves which respectively extend in a tire peripheral direction and the direction crossing the peripheral direction among the tread edge. The horizontal and vertical main grooves form an outer side block row located in a line with the tire peripheral direction in the tread surface.

USE - For mounting to wheel of vehicle.

ADVANTAGE - Tire abrasion produced in the shoulder block accompanied by the swing and running can be inhibited effectively and the control stability of tire can be maintained continuously for a long time, since the chamfer width increases towards back side from the front side of the groove wall beside the tire equator side of the shoulder block. A good appearance can be imparted to the tire.

DESCRIPTION OF DRAWING(S) - The figure shows a perspective view of shoulder block structure of pneumatic tire. (Drawing includes non-English language text).

Tread surface 2S

Vertical main groove 10B

Shoulder block 12

Equator side groove wall 16

Chamfer 17

Bottom and top edges of chamfer KL, KU

CHOSEN-DRAWING: Dwg. 4/6

TITLE-TERMS: PNEUMATIC VEHICLE CHAMFER PRESET WIDTH CUT BOTTOM TOP EDGE GROOVE WALL SHOULDER BLOCK SO CHAMFER WIDTH WIDE BACK FRONT

DERWENT-CLASS: A95 Q11

CPI-CODES: A12-T01B;

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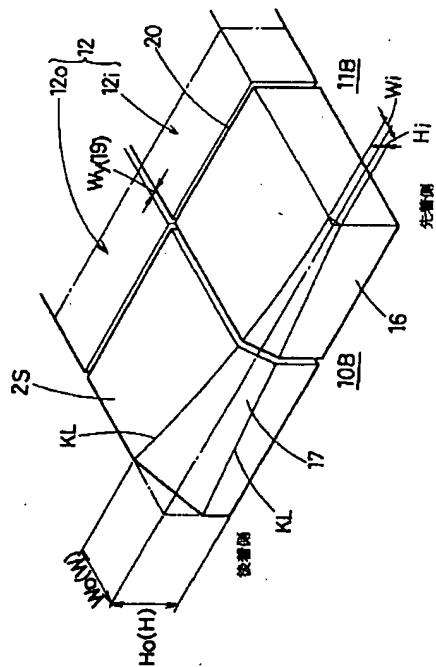
弁理士 苗村 正 (外1名)

(54)【発明の名称】 空気入りタイヤ

(57)【要約】

【課題】 旋回走行に伴うショルダーブロックでの偏摩耗を抑制する。

【解決手段】 ショルダーブロック12のタイヤ赤道側の溝壁16に、溝壁16に交わる下の稜縁K Lと、トレッド面2Sに交わる上の稜縁K Uとの間の面取り巾W が、タイヤ先着側から後着側に向かって増大する面取り部17を形成する。後着側のブロック端における面取り巾W oは、先着側のブロック端における面取り巾W iの2倍以上、かつ8.0mm以下である。



## 【特許請求の範囲】

【請求項1】トレッド面に、タイヤ赤道の両側でタイヤ周方向にのびる複数本の縦主溝とこれに交差する向きの横主溝とを設けることにより、トレッド縁と横主溝と前記トレッド縁に最も近い縦主溝とに囲まれたショルダーブロックがタイヤ周方向に並ぶ外側ブロック列を形成する一方、

前記ショルダーブロックの前記縦主溝に臨むタイヤ赤道側の溝壁を面取り状に切欠き、該切欠きの半径方向内方端が前記溝壁と交わる下の稜縁と、切欠きがトレッド面となす上の稜縁との間のタイヤ軸方向の長さである面取り巾Wが、タイヤ先着側から後着側に向かって増大する面取り部を形成するとともに、前記後着側のブロック端における面取り巾W<sub>0</sub>は、前記先着側のブロック端における面取り巾W<sub>1</sub>の2倍以上、かつ8.0mm以下であることを特徴とする空気入りタイヤ。

【請求項2】前記面取り部は、前記下の稜縁と、上の稜縁との間のタイヤ半径方向の長さである面取り深さH<sub>0</sub>を、タイヤ先着側から後着側に向かって増大するとともに、前記後着側のブロック端における面取り深さH<sub>0</sub>は、前記先着側のブロック端における面取り深さH<sub>1</sub>の2倍以上、かつ6.0mm以下であることを特徴とする請求項1記載の空気入りタイヤ。

【請求項3】前記面取り巾Wは、タイヤ先着側から後着側に向かって曲線状に漸増することを特徴とする請求項1又は2記載の空気入りタイヤ。

【請求項4】前記ショルダーブロックは、前記隣合う横主溝の間に、横主溝と同方向に傾斜する溝巾W<sub>y</sub>が2.0mm以下のサイフ状の横細溝を形成したことを特徴とする請求項1、2又は3記載の空気入りタイヤ。

【請求項5】前記トレッド面は、タイヤを正規リムにリム組みしかつ正規内圧を充填した標準状態のタイヤ子午断面において、タイヤ赤道側からトレッド縁側に向かって滑らかに連なりかつ曲率半径を違えた少なくとも5つの円弧部からなり、かつ各円弧部は、タイヤ赤道側からトレッド縁側に向かって曲率半径を順次減じたことを特徴とする請求項1、2、3又は4記載の空気入りタイヤ。

【請求項6】前記トレッド面は、前記ショルダーブロックのタイヤ軸方向内側に、前記縦主溝と、横主溝とに囲まれる内側ブロックがタイヤ周方向に並ぶ内側ブロック列を有し、この内側ブロックのタイヤ軸方向外側の溝壁を面取り状に切欠き、面取り巾Wがタイヤ先着側から後着側に向かって減じる面取り部を形成したことを特徴とする請求項1、2、3、4又は5記載の空気入りタイヤ。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、旋回走行に伴うシ

ヨルダーブロックでの偏摩耗を好適に防止しうる空気入りタイヤに関する。

## 【0002】

【従来の技術、及び発明が解決しようとする課題】空気入りタイヤでは、旋回時、トレッドショルダ一部に横方向の力が強く作用する。従って、このトレッドショルダ一部にブロックを形成したブロックパターン、或いはリブ・ブロックパターンのタイヤでは、例えばワインディング路を高速走行するなど急激なハンドル操作を伴う苛酷な走行をする場合には、ショルダーブロックが横方向に変形する。

【0003】その結果、図6に略示する如く、ショルダーブロックaに、そのタイヤ軸方向内向き縁a1を起点として偏摩耗bが発生し進行していくなど、操縦安定性が比較的早期に低下してしまうという問題がある。特にこの偏摩耗bは、接地先着側から後着側に向かって大きくなる傾向がある。

【0004】そのために、従来、ショルダーブロックaの壁面の傾斜角度αを大きくしたり、又ショルダーブロックaを大型化するなどしてブロック横剛性を高め、変形自体を抑制することが行われているが、充分な効果を得るに至っていない。

【0005】そこで本発明は、ショルダーブロックのタイヤ赤道側の溝壁に、面取り巾Wが先着側から後着側に向かって所定範囲で増大する面取り部を形成することを基本として、前記偏摩耗を効果的に抑制でき、操縦安定性や外観性を長期に亘って維持しうる空気入りタイヤの提供を目的としている。

## 【0006】

【課題を解決するための手段】前記目的を達成するため、本願請求項1の発明は、トレッド面に、タイヤ赤道の両側でタイヤ周方向にのびる複数本の縦主溝とこれに交差する向きの横主溝とを設けることにより、トレッド縁と横主溝と前記トレッド縁に最も近い縦主溝とに囲まれたショルダーブロックがタイヤ周方向に並ぶ外側ブロック列を形成する一方、前記ショルダーブロックの前記縦主溝に臨むタイヤ赤道側の溝壁を面取り状に切欠き、該切欠きの半径方向内方端が前記溝壁と交わる下の稜縁と、切欠きがトレッド面となす上の稜縁との間のタイヤ軸方向の長さである面取り巾Wが、タイヤ先着側から後着側に向かって増大するとともに、前記後着側のブロック端における面取り巾W<sub>0</sub>は、前記先着側のブロック端における面取り巾W<sub>1</sub>の2倍以上、かつ8.0mm以下であることを特徴としている。

【0007】また請求項2の発明では、前記面取り部は、前記下の稜縁と、上の稜縁との間のタイヤ半径方向の長さである面取り深さH<sub>0</sub>を、タイヤ先着側から後着側に向かって増大するとともに、前記後着側のブロック端における面取り深さH<sub>0</sub>は、前記先着側のブロック端における面取り深さH<sub>1</sub>の2倍以上、かつ6.0mm以下

であることを特徴としている。

【0008】また請求項3の発明では、前記面取り巾Wは、タイヤ先着側から後着側に向かって曲線状に漸増することを特徴としている。

【0009】また請求項4の発明では、前記ショルダーブロックは、前記隣合う横主溝の間に、横主溝と同方向に傾斜する溝巾W<sub>y</sub>が2.0mm以下のサイブ状の横細溝を形成したことを特徴としている。

【0010】また請求項5の発明では、前記トレッド面は、タイヤを正規リムにリム組みしつつ正規内圧を充填した標準状態のタイヤ子午断面において、タイヤ赤道側からトレッド縁側に向かって滑らかに連なりかつ曲率半径を違えた少なくとも5つの円弧部からなり、かつ各円弧部は、タイヤ赤道側からトレッド縁側に向かって曲率半径を順次減じたことを特徴としている。

【0011】また請求項6の発明では、前記トレッド面は、前記ショルダーブロックのタイヤ軸方向内側に、前記縦主溝と、横主溝とに囲まれる内側ブロックがタイヤ周方向に並ぶ内側ブロック列を有し、この内側ブロックのタイヤ軸方向外側の溝壁を面取り状に切欠き、面取り巾Wがタイヤ先着側から後着側に向かって減じる面取り部を形成したことを特徴としている。

【0012】なお本願において、前記「正規リム」とは、JATMAで規定する標準リム、TRAで規定する "Design Rim"、或いはETRTOで規定する "Measuring Rim" であり、前記「正規内圧」とは、JATMAで規定する最高空気圧、TRAで規定する表 "TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES" に記載の最大値、或いはETRTOで規定する "INFLATION PRESSURE" を意味し、特に乗用車用タイヤに場合には180KPaとする。

【0013】又前記「トレッド縁」とは、前記標準状態のタイヤに、正規荷重を負荷した時にトレッド面が接地しうる接地面領域の両端縁を意味し、又「正規荷重」とはJATMAであれば最大負荷能力、TRAであれば表 "TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES" に記載の最大値、ETRTOであれば "LOAD CAPACITY" である。

#### 【0014】

【発明の実施の形態】以下、本発明の実施の一形態を、図示例とともに説明する。図1は本発明の空気入りタイヤが正規リムにリム組みされかつ正規内圧を充填した標準状態における子午断面、図2はそのトレッドパターンの展開図、図3、4はショルダーブロックを拡大して示す平面図及び斜視図である。

【0015】図において、空気入りタイヤ1は、トレッド部2からサイドウォール部3をへてビード部4のビードコア5の廻りで折り返して係止されるカーカス6と、このカーカス6の半径方向外側かつトレッド部2の内方に配されるベルト層7とを具える。

【0016】前記カーカス6は、カーカスコードをタイヤ周方向に対して、例えば75～90°の角度で配列した1枚以上 本例では1枚のカーカスプライ6Aからなり、前記カーカスコードとして、例えばナイロン、ポリエスチル、レーヨン、芳香族ポリアミドなどの有機繊維コードが好適に採用できる。

【0017】前記ベルト層7は、スチールコード、芳香族ポリアミド等の高弾性のベルトコードをタイヤ周方向に対して10～35度の角度を有して配列した2枚以上、本例では2枚のベルトプライ7A、7Bから形成される。そして、各ベルトコードがプライ間で交差するようコードの傾斜方向を互いに違えて重置することにより、トレッド部2の略全巾をタガ効果を有して補強しつつトレッド剛性を高めている。

【0018】次に、本実施態様の空気入りタイヤ1では、図2に示すように、トレッド面2Sに、タイヤ赤道Cの両側でタイヤ周方向にのびる複数本の縦主溝10と、これに交差する向きの横主溝11とを設けることにより、トレッド縁TEと横主溝11と前記トレッド縁TEに最も近い縦主溝10とに囲まれたショルダーブロック12がタイヤ周方向に並ぶ外側ブロック列13を形成している。

【0019】詳しくは、前記縦主溝10は、本例では、タイヤ赤道側の内の縦主溝10Aと、トレッド縁TE側の外の縦主溝10Bとの4本からなり、各縦主溝10が実質的に直線状にのびる場合を例示している。

【0020】又前記横主溝11は、本例では、前記内外の縦主溝10A、10B間を繋ぐことにより内側ブロック14がタイヤ周方向に並ぶ内側ブロック列15を形成する内の横主溝11A、及び前記外の縦主溝10Bとトレッド縁TEとの間を繋ぐことにより前記ショルダーブロック12が並ぶ外側ブロック列13を形成する外の横主溝11Bを含むものを例示している。

【0021】そして本実施態様では、図3に拡大して示すように、前記ショルダーブロック12の前記外の縦主溝10Bに臨むタイヤ赤道C側の溝壁16に、該溝壁16を面取り状に切欠いてなる面取り部17を形成している。

【0022】この面取り部17では、図4に概念的に示すように、前記切欠きが前記溝壁16と交わる下の稜縁KLと、切欠きがトレッド面2Sとなす上の稜縁KUとの間のタイヤ軸方向の長さである面取り巾Wが、タイヤ先着側から後着側に向かって増大している。このとき、後着側のブロック端における面取り巾W<sub>0</sub>は、先着側のブロック端における面取り巾W<sub>1</sub>の2倍以上、かつ8.0mm以下である。

【0023】又本例では、前記面取り部17は、さらに、前記下の稜縁KLと上の稜縁KUとの間のタイヤ半径方向の長さである面取り深さHを、タイヤ先着側から後着側に向かって増大してなり、しかも後着側のブロッ

ク端における面取り深さ  $H_0$  を、先着側のブロック端における面取り深さ  $H_i$  の2倍以上、かつ6.0mm以下に設定している。

【0024】このような面取り部17を形成したショルダーブロック12では、偏摩耗の起点となる、溝壁16側のブロックエッジを予め切除しているため、前記偏摩耗の発生及びその進行を抑制できる。特に、旋回時に作用する外力が先着側から後着側に向かって増大するため、これに応じて前記面取り部17の大きさを変化させることにより、偏摩耗をより効果的に抑制できる。

【0025】又旋回時に作用する前記外力は、その増加率自体、先着側から後着側に向かって漸増する傾向があり、従って前記面取り巾  $W$  を、先着側から後着側に向かって曲線状に漸増させる、すなわち上の稜縁  $K_U$  を、タイヤ軸方向内方に凸る円弧状に湾曲させて形成するが、最低限の面取り量で、より高い偏摩耗抑制効果をうる上で好ましい。なお本例では、金型作製を容易にするために、前記下の稜縁  $K_L$  を略直線状で形成している。

【0026】ここで、前記後着側の面取り巾  $W_0$  が8.0mmをこえると、ショルダーブロック12における接地面積が過小となり、新品タイヤでの走行性能を阻害する。逆に面取り巾  $W_0$  が先着側の面取り巾  $W_i$  の2倍未満では、偏摩耗抑制効果が不十分となり、後着側のブロックエッジから偏摩耗が発生傾向となる。従って、面取り巾  $W_0$  は、 $2 \times W_i \sim 6.0\text{mm}$  とするのが望ましい。

【0027】同様に、前記後着側の面取り深さ  $H_0$  は、6.0mmをこえると、新品タイヤでの走行性能が損なわれる傾向となり、逆に先着側の面取り深さ  $H_i$  の2倍未満では、偏摩耗抑制効果が十分発揮できなくなる。従って、面取り深さ  $H_0$  は、 $2 \times H_i \sim 4.0\text{mm}$  とするのがより望ましい。

【0028】又本例では、前記ショルダーブロック12には、前記隣合う横主溝11B、11B間に、該横主溝11Bと同方向に傾斜する横細溝19を形成し、該ショルダーブロック12を先着側及び後着側のブロック部分12i、12oに分割した場合を例示する。この横細溝19は、溝巾  $W_y$  が2.0mm以下のサイフ状をなし、旋回時には溝壁が互いに接触し、見かけのブロック横剛性を高く維持できる。従って、ウェット性能を向上しながら、コーナリングフォースを大きく確保しうる。又偏摩耗の発生を、後着側のブロック部分12oに限定できることから、面取り巾  $W$  を減じることができ、新品タイヤにおける接地面積の減少を抑えることが可能となる。

【0029】ここで、前記面取り部17は、図1に示すように、

- ① 前記横主溝11のタイヤ周方向に対する角度  $\theta$  が30°～90°、
- ② 前記外の縦主溝10Bの溝巾  $W_g$  が4～12mm、
- ③ 前記外の縦主溝10Bの溝中心のタイヤ赤道Cから

の距離しが、トレッド縁TEのタイヤ赤道Cからの距離  $TW$  の0.40～0.80倍、のタイヤ、特に前記角度  $\theta$  が40°～70°、距離しが0.45×TW～0.75×TWのタイヤに、より好ましく採用しうる。

【0030】これは、前記角度  $\theta$  が30°未満、溝巾  $W_g$  が1.2mmより大、及び距離しが0.80×TWより大では、ブロック剛性が過小となるなど旋回時のブロック変形が大きくなりすぎ、前記面取り部17だけでは偏摩耗を充分に抑制効果することが難しくなるからである。

又溝巾  $W_g$  が4mm未満では、ブロック剛性が高く、偏摩耗自体が発生し難いため、面取り部17の必要性が低くなるためである。又距離しが0.4×TW未満では、旋回時に受ける外力がそれほど大きくなく、同様に偏摩耗自体が発生し難く、面取り部17の必要性が低くなるとともに、この外の縦主溝10Bの位置が接地圧力の高い赤道側となりノイズ性能が悪化するためである。

【0031】なお前記ショルダーブロック12には、本例ではさらに、前記トレッド縁TEの近傍に、タイヤ周方向にのびる、例えば溝巾2.0mm以下のサイフ状の縦細溝20を形成し、ワンダリング性能を高めるとともに、トレッド縁TEを起点とした所謂ショルダーバイ摩耗（肩落ち摩耗）のタイヤ軸方向内方への進行を防止している。

【0032】又本例では、前記溝壁16と対向する前記内側ブロック14の溝壁21にも、面取り部22を形成している。この面取り部22では、前記面取り部17とは逆に、少なくとも面取り巾  $W$  が、本例では、面取り巾  $W$  と面取り深さ  $H$  とがタイヤ先着側から後着側に向かって減少している。これにより、前記外の縦主溝10Bの溝容積の変化を抑え、排水性能を均一化している。

【0033】なお、前記内側ブロック14のタイヤ赤道側の溝壁23にも、この内側ブロック14における偏摩耗抑制のために、前記面取り部17と同構成の面取り部17'を形成している。しかし、旋回時に受ける外力の大きさに準じ、面取り部17'の面取り巾  $W$  及び面取り深さ  $H$  は、前記面取り部17のものより相対的に小に設定するのが、接地面積確保の上で好ましい。なお内側ブロック14にも、隣合う横主溝11A、11A間に、この横主溝11Aと同方向に傾斜する溝巾2.0mm以下のサイフ状の横細溝24を形成している。本例では、内側ブロック列15を外側ブロック列13に対して略半ピッチ周方向に変位させており、これにより、横細溝24と外側の横主溝11Bとが、また横細溝19と内側の横主溝11Aとが、夫々タイヤ軸方向に連なるごとく構成している。

【0034】次に、本例ではさらに、前記標準状態のタイヤ子午断面におけるトレッド面2Sが、図5に示すように、タイヤ赤道C側からトレッド縁TE側に向かって滑らかに連なりかつ曲率半径  $R$  を違えた少なくとも5つ

の円弧部Pからなり、かつ各円弧部Pが、タイヤ赤道C側からトレッド縁T E側に向かって曲率半径Rを順次減じた好ましい場合を例示している。特に本例では、トレッド面2Sが第1～第10の円弧部P1～P10からなり、曲率半径R1～R10が、

R1>R2>R3>R4>R5>R6>R7>R8>R9>R10

で滑らかに連なる場合を例示している。

【0035】このような、複数の円弧部Pからなるトレッド面2Sは、直進時から旋回時への接地面形状（所謂フットプリント）の変化が少ない。すなわち、接地圧が均一化し、旋回時、ショルダーブロック12に作用する力が軽減される。その結果、面取り部17との相乗作用によって、本願の偏摩耗抑制効果をより有効に發揮させることができる。

【0036】以上、本発明の特に好ましい実施形態について詳述したが、本発明は図示の実施形態に限定されることなく、種々の態様に変形して実施しうる。

【0037】

【実施例】図1に示す構造をなしかつ図2に準じたトレッドパターンを有するタイヤサイズが225/55R16の空気入りタイヤを表1の仕様に基づき試作するとともに、各試供タイヤの新品時の操縦安定性、摩耗後の操縦安定性、及び摩耗後の外観をテストした。

\* 【0038】(1) 操縦安定性：試供タイヤをリム(8J)、内圧(230kPa)の条件下で車両(2500cc)の全輪に装着し、ドライアスファルトのタイヤテストコースを走行し、ハンドル応答性、剛性感、グリップ等に関する特性をドライバーの官能評価により従来例を100とする指数で表示している。指数の大きい方が良好である。なお新品時の操縦安定性は、例えば30kmの慣らし走行後に測定したものであり、摩耗後の操縦安定性は、内側の縦主溝10Aにおける溝深さが60%となる摩耗状態まで、ワインディング路を走行した後に測定した。

【0039】(2) 摩耗後の外観

前記摩耗後の外観状態を目視検査によって、従来例を100とする指数で表示している。指数の大きい方が良好である。

【0040】(3) ノイズ性

前記操縦安定性のテストで使用した車両を用い、スムース路面を速度100km/hから40km/hまで惰行走行(ギヤをニュートラルで惰性走行)させ、車内騒音をドライバーの官能評価により従来例を100とする指数で表示している。指数の大きい方が良好である。

【0041】

【表1】

	従来例	比較例 1	比較例 2	実施例 1	実施例 2	実施例 3
横主溝の						
・角度θ(度)	45	45	45	45	65	45
・溝巾(mm)	5	5	5	5	5	5
縦主溝の						
・溝巾Wg(mm)	8	8	8	8	8	8
・距離L(XTW)	0.6	0.6	0.6	0.6	0.6	0.5
面取り部の有/無	無	有	有	有	有	有
・面取り巾Wo(mm)	—	10	3	5	5	5
・面取り巾Wi(mm)	—	4	3	2	2	2
・比Wo/Wi	—	2.5	1.0	2.5	2.5	2.5
・面取り深さHo(mm)	—	7	3	4	4	4
・面取り深さHi(mm)	—	3	3	1.5	1.5	1.5
・比Ho/Hi	—	2.3	1.0	2.6	2.6	2.6
操縦安定性						
・新品時	100	80	85	95	90	100
・摩耗後	100	90	95	110	105	115
摩耗後の外観性	100	110	100	120	110	125
ノイズ性	100	95	100	100	110	90

【0042】表の如く、実施例のタイヤは、新品時における操縦安定性をほとんど阻害することなく、偏摩耗を大幅に抑制でき、操縦安定性や外観性を長期に亘って高く維持できるのが確認できる。

【0043】

【発明の効果】本発明は、叙上の如く、ショルダーブロックのタイヤ赤道側の溝壁に、面取り巾Wが先着側から後着側に向かって所定範囲で増大する面取り部を形成しているため、ショルダーブロックに生ずる偏摩耗を効果的に抑制でき、操縦安定性や外観性を長期に亘って維持する。

40※【図面の簡単な説明】

【図1】本発明の一実施例のタイヤの断面図である。

【図2】そのトレッドパターンを示す展開図である。

【図3】ショルダーブロックを拡大して示す平面である。

【図4】面取り部を概念的に示すショルダーブロックの略斜視図である。

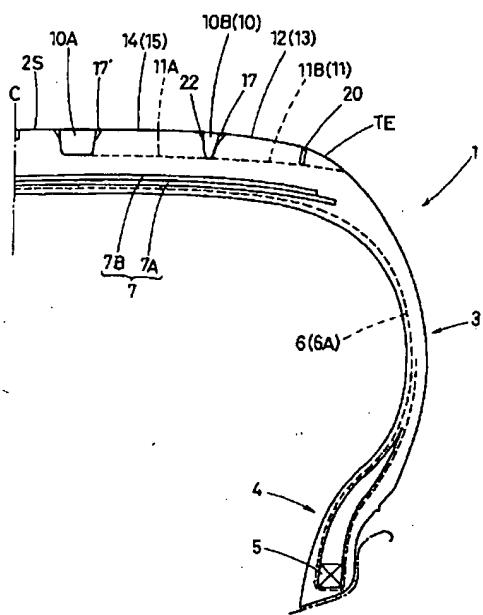
【図5】トレッド面の輪郭形状を示す線図である。

【図6】従来技術の問題点を説明する線図である。

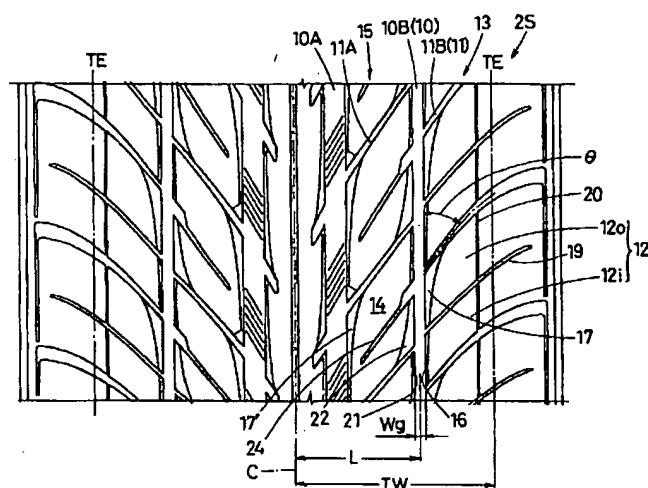
【符号の説明】

1 0	縦主溝	2 1	溝壁
1 1	横主溝	2 2	面取り部
1 2	ショルダーブロック	C	タイヤ赤道
1 3	外側ブロック列	K L	下の稜線
1 4	内側ブロック	K U	上の稜線
1 5	内側ブロック列	P, P 1 ~ P 1 0	円弧部
1 6	溝壁	R, R 1 ~ R 1 0	曲率半径
1 7	面取り部	TE	トレッド縁
1 9	横細溝		

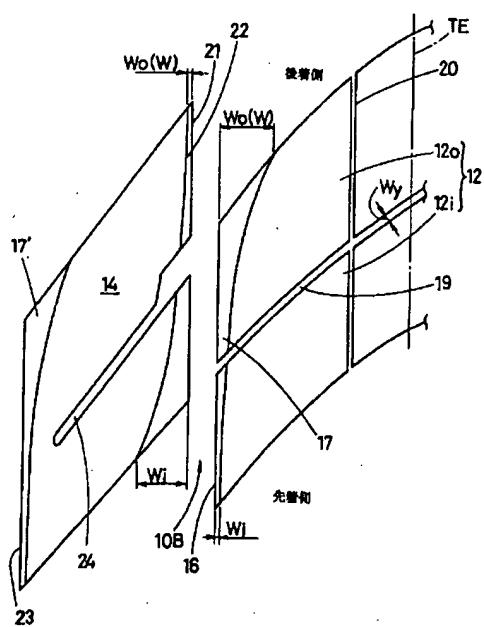
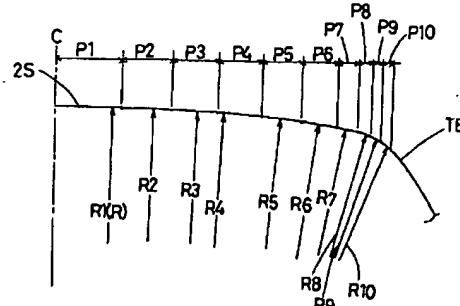
【図1】



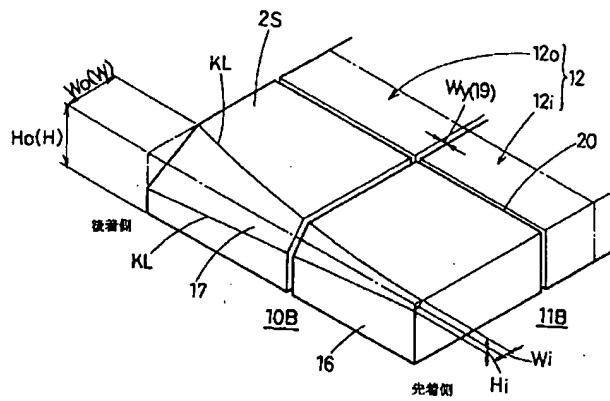
【図2】



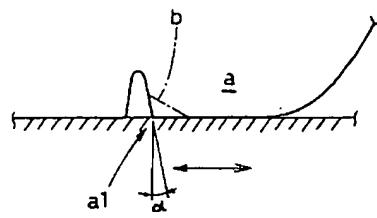
【図5】



【図4】



【図6】



## \* NOTICES \*

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

#### [0001]

[Field of the Invention] This invention relates to the pneumatic tire which can prevent suitably the partial wear in the shoulder block accompanying turning transit.

#### [0002]

[Description of the Prior Art] In a pneumatic tire, the lateral force acts on the tread shoulder section strongly at the time of turning. Therefore, with the tire of the block pattern which formed the block in this tread shoulder section, or the Liv Brock pattern, in carrying out cruel transit accompanied by rapid handle actuation, such as carrying out high-speed transit of the winding way, for example, a shoulder block deforms into a longitudinal direction.

[0003] Consequently, there is a problem that driving stability will fall at an early stage comparatively -- partial wear b occurs and advances to shoulder Brock a with the sense edge a1 within tire shaft orientations as the starting point -- so that it may sketch in drawing 6. Wears the back from a touch-down first-arrival side, and especially this partial wear b tends to become large toward a side.

[0004] Although enlarging alpha whenever [ tilt-angle / of shoulder Brock's a wall surface ] conventionally, and enlarging shoulder blocking a, raising Brock horizontal rigidity, and controlling the deformation itself is performed, it has come [ therefore, ] to acquire sufficient effectiveness.

[0005] Then, this invention can control said partial wear effectively on the basis of forming the chamfer to which the beveling width W wears from a first-arrival side the back to the groove face by the side of the tire equator of shoulder blocking, and increases in the predetermined range toward a side to it, and aims at offer of the pneumatic tire which continues at a long period of time and can maintain driving stability and appearance nature.

#### [0006]

[Means for Solving the Problem] In order to attain said object, invention of this application claim 1 By preparing the horizontal major groove of the sense which intersects two or more vertical major grooves extended to a tire hoop direction on both sides of the tire equator, and this in a tread side While the shoulder blocking surrounded by the tread edge, the horizontal major groove, and the vertical major groove nearest to said tread edge forms the outer block train on a par with a tire hoop direction \*\*\* of the bottom at which the method edge of the inside of radial of a notch and this notch crosses said groove face in the shape of beveling in the groove face by the side of the tire equator which attends said vertical major groove of said shoulder blocking, While forming the chamfer to which the beveling width W which is the die length of the tire shaft orientations between \*\*\* when a notch makes with a tread side wears the back from a tire first-arrival side, and increases toward a side It wears said back and beveling width Wo in the near Brock edge is characterized by being the more than twice of the beveling width Wi in the Brock edge by the side of said first arrival, and 8.0mm or less.

[0007] Moreover, in invention of claim 2, while said chamfer is worn the back from a tire first-arrival side and increases toward a side, beveling depth H which is the die length tire radial [ between \*\*\* of said bottom, and the upper \*\*\* ] It wears said back and the beveling depth Ho in the near Brock edge is

characterized by being the more than twice of the beveling depth  $H_1$  in the Brock edge by the side of said first arrival, and 6.0mm or less.

[0008] Moreover, in invention of claim 3, it is characterized by wearing said beveling width  $W$  the back from a tire first-arrival side, and increasing it gradually in the shape of a curve toward a side.

[0009] Moreover, in invention of claim 4, said shoulder blocking is characterized by the flute width  $W_y$  which inclines in a horizontal major groove and this direction forming the horizontal striation of the shape of SAIPU 2.0mm or less between said \*\*\*\*\* horizontal major grooves.

[0010] Moreover, in invention of claim 5, it is characterized by for said tread side having consisted of at least five radii sections which stood in a row smoothly toward the tread veranda from the tire equator side, and changed radius of curvature in the tire meridional section of the reference condition which carried out rim \*\*\*\* of the tire at the normal rim, and was filled up with normal internal pressure, and each radii section subtracting radius of curvature from a tire equator side one by one toward a tread veranda.

[0011] Moreover, in invention of claim 6, said tread side has the inner-block train to which the inner block surrounded inside [ tire shaft-orientations ] said shoulder blocking at said vertical major groove and a horizontal major groove is located in a line with a tire hoop direction, and is characterized by forming the chamfer which a notch and the beveling width  $W$  wear the groove face of the tire shaft-orientations outside of this inner block the back from a tire first-arrival side, and reduces it toward a side in the shape of beveling.

[0012] In addition, the standard rim specified as the above "a normal rim" by JATMA in this application, TRA prescribes. "Design Rim" or ETRTO prescribes. It is "Measuring Rim". With the above "normal internal pressure" The highest pneumatic pressure specified by JATMA, and table specified by TRA "TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES"

Maximum of a publication, Or ETRTO prescribes. "INFLATION PRESSURE" It means and is referred to as 180KPa(s) especially into the tire for passenger cars at a case.

[0013] moreover -- if the ends edge of the ground-plane field which a tread side can ground is meant, and a "normal load" is JATMA and the above "a tread edge" is maximum load capacity and TRA, when the load of the normal load is carried out to the tire of said reference condition -- table "TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES" If it is the maximum of a publication, and ETRTO It is "LOAD CAPACITY".

[0014]

[Embodiment of the Invention] Hereafter, one gestalt of operation of this invention is explained with the example of a graphic display. The meridional section in the reference condition with which, as for drawing 1, the pneumatic tire of this invention filled up rim \*\*\*\*\* and normal internal pressure into the normal rim, and drawing 2 are the development view of the tread pattern, drawing 3, the top view that 4 expands shoulder blocking and is shown, and a perspective view.

[0015] A pneumatic tire 1 is equipped with the belt layer 7 allotted to a way among the tread section 2 to the radial outsides of the carcass 6 turned up and stopped around the bead core 5 of a toe of bead 4 through the sidewall section 3, and this carcass 6 and the tread sections 2 in drawing.

[0016] Said carcass 6 is one or more sheets which arranged the carcass code at the include angle of 75-90 degrees as opposed to the tire hoop direction. In this example, it consists of carcass ply of one sheet 6A, and organic fiber codes, such as nylon, polyester, rayon, and aromatic polyamide, can adopt suitably as said carcass code.

[0017] Said belt layer 7 is formed from the belt plies 7A and 7B of two sheets by two or more sheets which have the include angle of 10 - 35 degrees, and arranged the belt of high elasticity, such as a steel code and aromatic polyamide, to the tire hoop direction, and this example. and the thing for which the dip direction of a code is changed mutually and superposed so that each belt may cross between plies -- \*\*\*\*\* of the tread section 2 -- a hoop -- effectiveness is had and reinforced and tread rigidity is raised.

[0018] Next, in the pneumatic tire 1 of this embodiment, as shown in drawing 2, the shoulder blocking 12 surrounded by the tread edge TE, the horizontal major groove 11, and the vertical major groove 10 nearest to said tread edge TE forms the outer block train 13 on a par with a tire hoop direction by

forming two or more vertical major grooves 10 extended to a tire hoop direction on both sides of the tire equator C, and the horizontal major groove 11 of the sense which intersects this in tread side 2S.

[0019] In detail, in this example, said vertical major groove 10 consisted of four of vertical major groove 10A of the inside by the side of the tire equator, and vertical major groove 10B of the outside by the side of the tread edge TE, and has illustrated the case where each vertical major groove 10 is substantially extended in the shape of a straight line.

[0020] Moreover, said horizontal major groove 11 has illustrated the thing containing horizontal major groove 11B of the outside which forms the outer block train 13 with which said shoulder blocking 12 is located in a line in this example by inheriting between horizontal major groove 11A of the inside which forms the inner-block train 15 to which an inner block 14 is located in a line with a tire hoop direction and vertical major groove 10B of said outside, and the tread edges TE by inheriting between said internal and external vertical major groove 10A and 10B.

[0021] and the groove face 16 by the side of the tire equator C which attends vertical major groove 10B besides [ said ] said shoulder blocking 12 as it expands to drawing 3 and this embodiment shows -- this groove face 16 -- the letter of beveling -- notching -- \*\*\*\* -- the chamfer 17 is formed.

[0022] In this chamfer 17, as notionally shown in drawing 4, the beveling width W which is the die length of the tire shaft orientations between \*\*\*\* KL of the bottom at which said notch crosses said groove face 16, and \*\*\*\* KU when a notch makes with tread side 2S wears the back from a tire first-arrival side, and is increasing toward a side. At this time, it wears the back and the beveling width Wo in the near Brock edge is the more than twice of the beveling width Wi in the Brock edge by the side of first arrival, and 8.0mm or less.

[0023] In the example of \*\*\*\*, further, said chamfer 17 was worn the back from the tire first-arrival side, came to increase toward the side, moreover, wore beveling depth H which is the die length tire radial [ between \*\*\*\* KL of said bottom and upper \*\*\*\* KU ] the back, and has set the beveling depth Ho in the near Brock edge as the more than twice of the beveling depth Hi in the Brock edge by the side of first arrival, and 6.0mm or less.

[0024] In the shoulder blocking 12 in which such a chamfer 17 was formed, since the block edge by the side of a groove face 16 used as the origin of partial wear is excised beforehand, generating and its progress of said partial wear can be controlled. Since the external force which acts especially at the time of turning wears the back from a first-arrival side and increases toward a side, partial wear can be more effectively controlled by changing the magnitude of said chamfer 17 according to this.

[0025] Moreover, there are the rate of increase itself and an inclination which wears the back from a first-arrival side and is increased gradually toward a side, therefore wear said beveling width W the back from a first-arrival side, and it is made to increase gradually in the shape of a curve toward a side, i.e., the method of the inside of tire shaft orientations is incurvated in the shape of \*\*\*\* radii, the minimum amount of beveling forms upper \*\*\*\* KU, and said external force which acts at the time of turning has it, when dealing in higher partial-wear depressor effect. [ desirable ] In addition, by this example, in order to make metal mold production easy, \*\*\*\* KL of said bottom is formed by the shape of an abbreviation straight line.

[0026] Here, if it wears said back and the near beveling width Wo surpasses 8.0mm, the crawler bearing area in shoulder blocking 12 will become [ too little ], and the performance-traverse ability in a new article tire will be checked. Conversely, the beveling width Wo becomes inadequate [ under 2 double / of the beveling width Wi by the side of first arrival / partial wear depressor effect ], it wears the back and partial wear serves as a generating inclination from a near block edge. Therefore, as for the beveling width Wo, being referred to as  $2 \times Wi - 6.0\text{mm}$  is desirable.

[0027] When similarly it wears said back and the near beveling depth Ho surpasses 6.0mm, it becomes the inclination for the performance-traverse ability in a new article tire to be spoiled, and it becomes impossible for partial wear depressor effect to demonstrate enough conversely by under 2 double [ of the beveling depth Hi by the side of first arrival ]. Therefore, as for the beveling depth Ho, being referred to as  $2 \times Hi - 4.0\text{mm}$  is more desirable.

[0028] In the example of \*\*\*\*, the case where formed the horizontal striation 19 which inclines in this

horizontal major groove 11B and this direction, wore this shoulder blocking 12 a first-arrival side and the back, and it divides into the near Brock parts 12i and 12o between said \*\*\*\*\* horizontal major groove 11B and 11B is illustrated to said shoulder blocking 12. At the time of nothing and turning, a groove face contacts [ a flute width Wy ] mutually the shape of SAIPU 2.0mm or less, and this horizontal striation 19 can maintain apparent Brock horizontal rigidity highly. Therefore, a cornering force can be secured greatly, improving the wet engine performance. Moreover, since generating of partial wear is worn the back and can be limited to near Brock partial 12o, the beveling width W can be reduced and it becomes possible to suppress reduction of the crawler bearing area in a new article tire. [0029] As said chamfer 17 is shown in drawing 1 , the include angle theta to the tire hoop direction of the \*\* aforementioned horizontal major groove 11 here 30-90 degrees, The flute width Wg of vertical major groove 10B of said outside \*\* The distance L from the tire equator C based on [ of vertical major groove 10B besides 4-12mm and the \*\* above ] slots 40-70 degrees and distance L can adopt [ the tire of 0.40 to 0.80 time \*\* of the distance TW from the tire equator C of the tread edge TE, especially said include angle theta ] it as the tire of 0.45xTW-0.75xTW more preferably.

[0030] This is because the Brock deformation at the time of turning -- said include angle theta becomes less than 30 degrees from 0.80xTW, and size and distance L become [ a flute width Wg / too little / the Brock rigidity ] from 12mm in size -- becomes large too much and it becomes difficult only by said chamfer 17 to fully carry out depressor effect of the partial wear. Moreover, in less than 4mm, the Brock rigidity has a high flute width Wg, and since it is hard to generate the partial wear itself, it is because the need for a chamfer 17 becomes low. Moreover, while it is hard to generate the partial wear itself similarly and the need for a chamfer 17 becomes [ the external force which distance L receives under by 0.4xTW at the time of turning ] not so large low, it is for the location of vertical major groove 10B the outside of this to become the high equator side of the ground pressure force, and for the noise engine performance to get worse.

[0031] In addition, in said shoulder blocking 12, by this example, for example, it is extended to a tire hoop direction, while forming the vertical striation 20 of the shape of SAIPU with a flute width of 2.0mm or less and raising the wander ring engine performance near said tread edge TE further, the progress to the so-called method of the inside of tire shaft orientations of the shoulder partial wear (shoulder omission wear) on the basis of the tread edge TE is prevented.

[0032] The chamfer 22 is formed also in said groove face 16 and the groove face 21 of said inner block 14 which counters in the example of \*\*\*\*. The beveling width W wears in this chamfer 22, the beveling width W and beveling depth H wear the back from a tire first-arrival side by this example at least conversely in said chamfer 17, and it is decreasing toward a side. Thereby, change of the slot volume of vertical major groove 10B of said outside is suppressed, and the wastewater engine performance is equalized.

[0033] In addition, chamfer 17' of said chamfer 17 and this configuration is formed also in the groove face 23 by the side of the tire equator of said inner block 14 for the partial wear control in this inner block 14. However, it is desirable on crawler-bearing-area reservation to set relatively the beveling width W of chamfer 17' and beveling depth H as smallness from the thing of said chamfer 17 according to the magnitude of the external force received at the time of turning. In addition, the horizontal striation 24 of the shape of SAIPU with a flute width of 2.0mm or less which inclines in this horizontal major groove 11A and this direction between \*\*\*\*\* horizontal major groove 11A and 11A is formed also in an inner block 14. The horizontal striation 19 and inside horizontal major groove 11A consist of these examples so that the abbreviation half pitch hoop direction may be made to carry out the variation rate of the inner-block train 15 to the outer block train 13 and the horizontal striation 24 and outside horizontal major groove 11B may stand in a row in tire shaft orientations by this again, respectively.

[0034] Next, in this example, the desirable case where consisted of at least five radii sections P in which tread side 2S in the tire meridional section of said reference condition stood in a row smoothly toward the tread edge TE side from the tire equator C side, and changed radius of curvature R further as shown in drawing 5 , and each radii section P subtracts radius of curvature R from the tire equator C side one by one toward the tread edge TE side is illustrated. especially -- this example -- tread side 2S -- the 1- it

consisted of the 10th radii section P1-P10, and the case where radius of curvatures R1-R10 stand in a row smoothly by R1>R2>R3>R4>R5>R6>R7>R8>R9>R10 is illustrated.

[0035] Tread side 2S which consist of such two or more radii sections P have little change of the ground-plane configuration from the time of rectilinear propagation to the time of turning (the so-called footprint). That is, ground pressure equalizes and the force of acting on shoulder blocking 12 is mitigated at the time of turning. Consequently, validity can be made to demonstrate the partial wear depressor effect of this application more by the synergism with a chamfer 17.

[0036] As mentioned above, although especially the desirable operation gestalt of this invention was explained in full detail, without being limited to the operation gestalt of a graphic display, it deforms into various modes and this invention can be carried out.

[0037]

[Example] While nothing and the tire size which has a tread pattern according to drawing 2 made the pneumatic tire of 225 / 55R16 for the structure shown in drawing 1 as an experiment based on the specification of a table 1, the driving stability at the time of the new article of each sample offer tire, the driving stability after wear, and the appearance after wear were tested.

[0038] (1) Driving stability : all the rings of a car (2500 cc) are equipped with a sample offer tire under a rim (8J) and the conditions of internal pressure (230kPa) \*\*, it runs the tire test course of dry asphalt, and the property about handle responsibility, a feeling of rigidity, a grip, etc. is expressed as the characteristic which sets the conventional example to 100 by organic-functions assessment of a driver. The one where a characteristic is larger is good. In addition, it tamed and measured after transit, and the driving stability at the time of a new article measured the driving stability after wear, after running a winding way to the wear condition that the channel depth in inside vertical major groove 10A of 30km becomes 60%.

[0039] (2) Display the appearance condition after the appearance aforementioned wear after wear by the visual inspection as the characteristic which sets the conventional example to 100. The one where a characteristic is larger is good.

[0040] (3) Using the car used by the test of the noise nature aforementioned driving stability, carry out coasting transit (it is neutral in a gear and is inertia transit) of the smooth road surface from rate 100 km/h to 40 km/h, and display the noise in the car by organic-functions assessment of a driver as the characteristic which sets the conventional example to 100. The one where a characteristic is larger is good.

[0041]

[A table 1]

	従来例	比較例 1	比較例 2	実施例 1	実施例 2	実施例 3
横主溝の						
・角度θ(度)	4 5	4 5	4 5	4 5	6 5	4 5
・溝巾<mm>	5	5	5	5	5	5
縦主溝の						
・溝巾Wg<mm>	8	8	8	8	8	8
・距離L(xTW)	0.6	0.6	0.6	0.6	0.6	0.5
面取り部の有/無	無	有	有	有	有	有
・面取り巾Wo<mm>	—	1 0	3	5	5	5
・面取り巾Wi<mm>	—	4	3	2	2	2
・比Wo/Wi	—	2.5	1.0	2.5	2.5	2.5
・面取り深さHo<mm>	—	7	3	4	4	4
・面取り深さHi<mm>	—	3	3	1.5	1.5	1.5
・比Ho/Hi	—	2.3	1.0	2.6	2.6	2.6
操縦安定性						
・新品時	1 0 0	8 0	8 5	9 5	9 0	1 0 0
・摩耗後	1 0 0	9 0	9 5	1 1 0	1 0 5	1 1 5
摩耗後の外観性	1 0 0	1 1 0	1 0 0	1 2 0	1 1 0	1 2 5
ノイズ性	1 0 0	9 5	1 0 0	1 0 0	1 1 0	9 0

[0042] Without the tire of an example checking most driving stability at the time of a new article, as shown in a table, partial wear can be controlled substantially and it can check that it continues at a long

period of time, and driving stability and appearance nature can be maintained highly.

[0043]

[Effect of the Invention] Since it forms the chamfer to which the beveling width W wears from a first-arrival side the back to the groove face by the side of the tire equator of shoulder blocking, and increases in the predetermined range toward a side to it like the above statement, this invention can control effectively the partial wear produced in shoulder blocking, continues at a long period of time, and can maintain driving stability and appearance nature.

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[Translation done.]

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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CLAIMS

## [Claim(s)]

[Claim 1] By preparing the horizontal major groove of the sense which intersects two or more vertical major grooves extended to a tire hoop direction on both sides of the tire equator, and this in a tread side. While the shoulder blocking surrounded by the tread edge, the horizontal major groove, and the vertical major groove nearest to said tread edge forms the outer block train on a par with a tire hoop direction \*\*\* of the bottom at which the method edge of the inside of radial of a notch and this notch crosses said groove face in the shape of beveling in the groove face by the side of the tire equator which attends said vertical major groove of said shoulder blocking. While forming the chamfer to which the beveling width W which is the die length of the tire shaft orientations between \*\*\* when a notch makes with a tread side wears the back from a tire first-arrival side, and increases toward a side. It is the pneumatic tire which wears said back and is characterized by the beveling width Wo in a near block edge being the more than twice of the beveling width Wi in the block edge by the side of said first arrival, and 8.0mm or less.

[Claim 2] Said chamfer is a pneumatic tire according to claim 1 which wears said back and is characterized by the beveling depth Ho in a near block edge being the more than twice of the beveling depth Hi in the block edge by the side of said first arrival, and 6.0mm or less while wearing beveling depth H which is the die length tire radial [ between \*\*\* of said bottom, and the upper \*\*\* ] the back from a tire first-arrival side and increasing toward a side.

[Claim 3] Said beveling width W is a pneumatic tire according to claim 1 or 2 characterized by wearing the back from a tire first-arrival side, and increasing gradually in the shape of a curve toward a side.

[Claim 4] Said shoulder blocking is a pneumatic tire according to claim 1, 2, or 3 characterized by the flute width Wy which inclines in a horizontal major groove and this direction forming the horizontal striation of the shape of SAIPU 2.0mm or less between said \*\*\*\*\* horizontal major grooves.

[Claim 5] It is the pneumatic tire according to claim 1, 2, 3, or 4 characterized by for said tread side having consisted of at least five radii sections which stood in a row smoothly toward the tread veranda from the tire equator side, and changed radius of curvature in the tire meridional section of the reference condition which carried out rim \*\*\* of the tire at the normal rim, and was filled up with normal internal pressure, and each radii section subtracting radius of curvature from a tire equator side one by one toward a tread veranda.

[Claim 6] Said tread side is a pneumatic tire according to claim 1, 2, 3, 4, or 5 characterized by forming the chamfer which has the inner-block train to which the inner block surrounded by said vertical major groove and the horizontal major groove is located in a line with a tire hoop direction, and a notch and the beveling width W wear the groove face of the tire shaft-orientations outside of this inner block the back from a tire first-arrival side, and reduces it toward a side in the shape of beveling inside [ tire shaft-orientations ] said shoulder blocking.

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[Translation done.]

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